Docket Number F-3278C Patent

#27 Dec 12/11/98

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Skeem, et al

Serial Number: 08/892,836 Examiner: G.Nguyen

Filed: 7/15/97 Group Art Unit: 3723

For: Metal Single Layer Abrasive Having a Contoured Cutting Surface

The Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

SECOND DECLARATION UNDER 37 CFR Section 1.132
of Inventor Sergej-Tomislav Buljan

1. I am a named inventor of the above-captioned patent application and I make this declaration in support of the patentability of the application over cited references U.S. Pat. No. 5,018,276 to Asada ("Asada"), U.S. Pat. N. 5,492,771 to Lowder, et al, ("Lowder") and U.S. Pat. No. 5,215,072 to Scott ("Scott").

2. I have a PhD in Solid State Science from The Pennsylvania State University, and over 30 years of experience in research and development working with a variety of materials. I presently hold the position of Manager, Superabrasives Research and Development, at Norton Company where I have worked in research and development relating to superabrasives and metal bonded cutting and grinding tool technologies for over 5 years.

3. Attached to my declaration as Appendix A are drawings of 4 diamond saw blades: 280, 277, 278 and E-plated. These 4 blades represent the following designs:

280: blade of the invention without negative rake (0° rake angle)

277: blade of the invention with negative rake

278: blade with negative rake having abrasive grain in successive rows rather than in successive rings around the teeth (representative of Scott cutting elements having rows, rather than rings of grains at a negative rake)

E-plated blade representing Asada design of equilateral teeth geometry and electroplated grain

4. All blades were made to 230 mm in diameter with 35/40 mesh, grade SDA 100+ mesh diamond grain bonded to a stainless steel cores of the same thicknesses and type. Nickel was used to electroplate grain for the E-plated sample. A chemically reactive braze containing a Cu-Sn-Ti alloy was used to bond the abrasive grain to the core in samples 280, 278 and 277.

5. Blades were mounted on a Bosch GWS 24-230 JC-2400W-6500RPM-max. electric saw for testing. An operator used this saw to make the following test cuts for each blade:

LEVEL 1. Soft Cement Brick.- 50 Cuts, 7 cm deep, 24cm long.

LEVEL 2. Abrasive Concrete Slabs.- 50 Cuts, 4 cm deep, 30 cm long.

LEVEL 3. Hard Concrete Slabs (Washed Concrete).- 30 Cuts, 2 cm deep, 25 cm long.

LEVEL 4. Hard Concrete Slabs (Washed Concrete).- 30 Cuts, 5 cm deep, 25 cm long.

6. Observations of cutting time for one pass and wear of the saw were made for the blades during the 4 levels of cutting tests. Measurements recorded included: (1) Speed of Cutting (Time required to complete 1 cut) and (2) Wear (Reduction in the blade radius). Experimental observations are summarized in the Table below.

Table 1 Cutting Test Results

	Sample 280	**Sample E-Plated**	**Sample 278**	**Sample 277**
Level 1				
Cutting time (s) ,1 pass.	3.00s	3.70s	4.16s	3.00s
Wear (mm)	0.0277 mm	0.0877 mm	0.2488 mm	0.0400 mm
Level 2				
Cutting time (s) ,1 pass.	8.00s	Stopped Cutting	8.00s	7.33s
Wear (mm)	0.0166 mm	Before 30 cuts.	1.5366 mm	0.0188 mm
Level 3				
Cutting time (s) ,1 pass.	12.42 s		Stopped Cutting	6.28s
Wear (mm)	0.0220 mm		after 23 cuts	0.0190 mm
Level 4				
Cutting time (s) ,1 pass.	Stopped Cutting			Stopped Cutting
Wear (mm)	after 3 cuts			after 9 cuts

7. These cutting test results demonstrate the following:

a) Electroplated blades of Asada are substantially inferior to chemically bonded blades of the invention in blade life.

b) Blades representative of Scott's design having rows of abrasive grain at a negative rake (278) are substantially inferior in blade life to blades of the invention having rings of abrasive grain either with (277) or without (280) a negative rake.

c) A negative rake angle is merely a preferred, and not an essential, embodiment for achieving the wear resistance and significantly prolonged tool life attributes of the tools of the invention.

8. Relative to the tools of the invention, the Scott tools are expected to yield a performance even more inferior than shown in these cutting tests because the Scott tools do not contain diamond abrasive chemically bonded to the mesh of the substrate.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Sergej-Tomislav Buljan, PhD Date: 11/25/98

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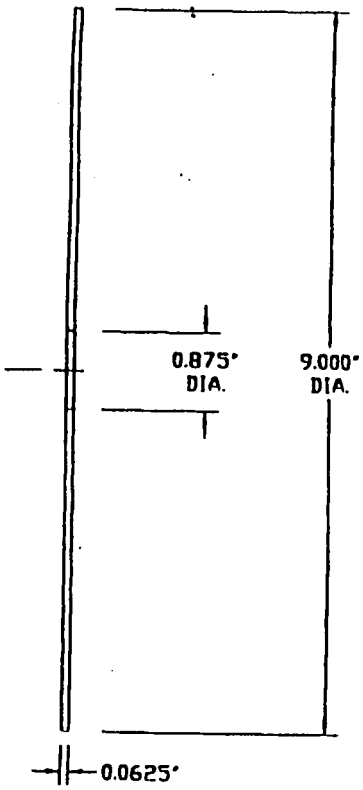
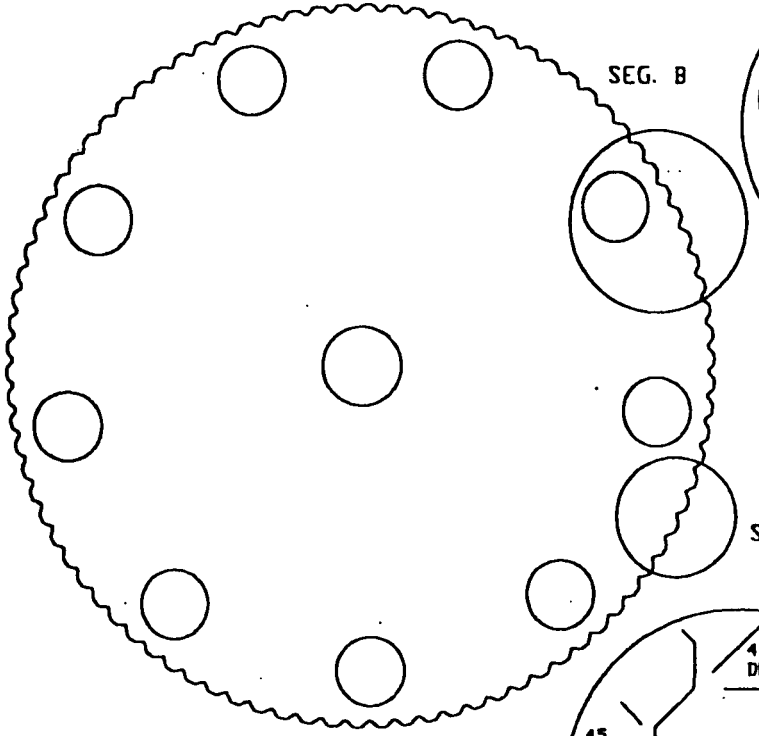
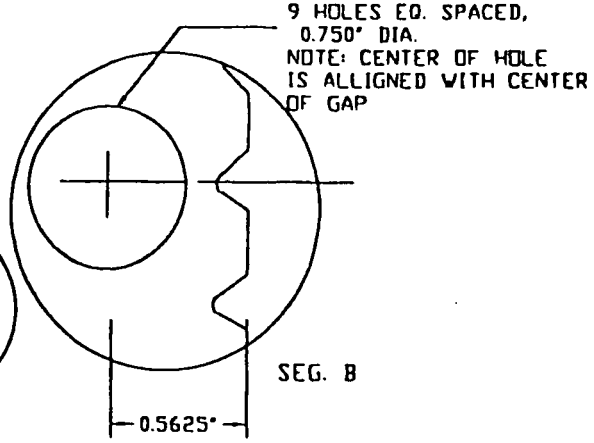
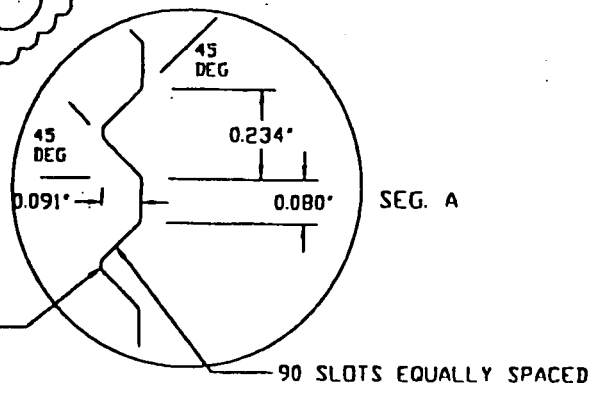
APPENDIX A

DRAWING NOT TO SCALE!









NOTES:

MATERIAL - 0186-5

TOLERANCES - +/- .005"
UNLESS OTHERWISE NOTED

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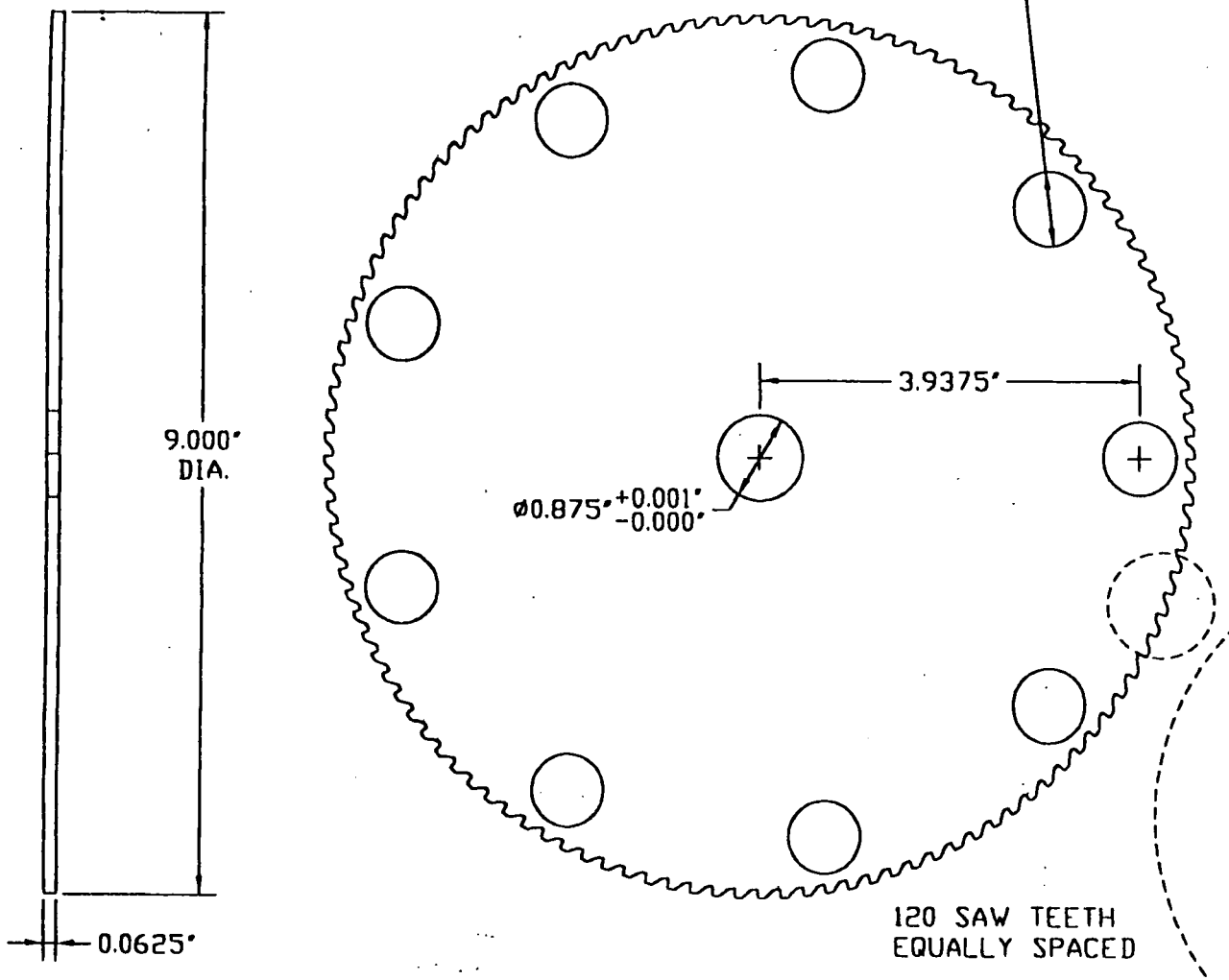
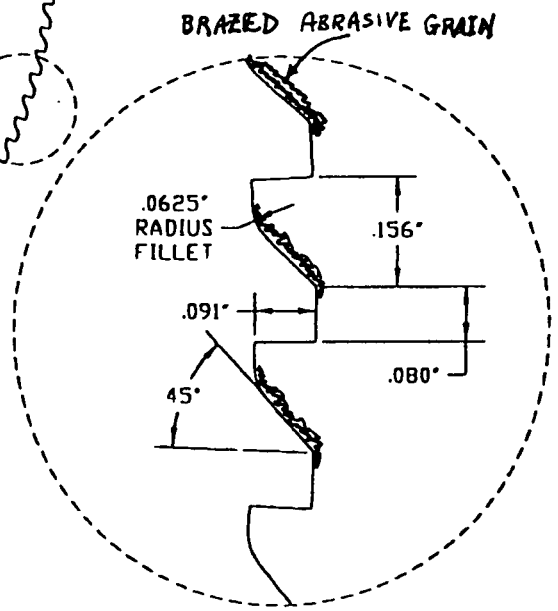
DWG.# 280

DRAWING NOT TO SCALE





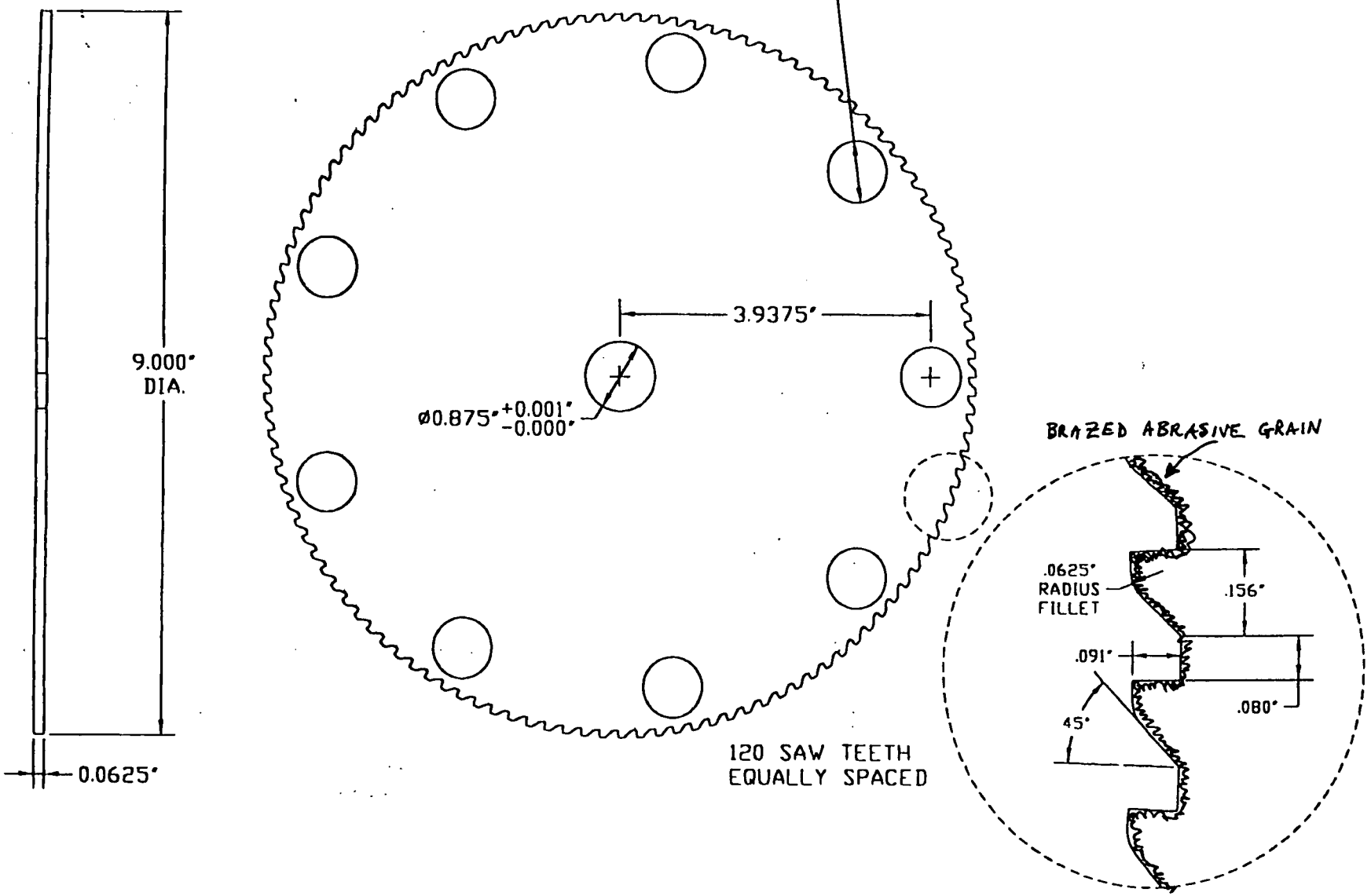
NOTES: MATERIAL: 86SS
TOLERANCES: +/- .005"
UNLESS OTHERWISE NOTED

CONFIDENTIAL

NORTON COMPANY

DWG.# 278

DRAWING NOT TO SCALE



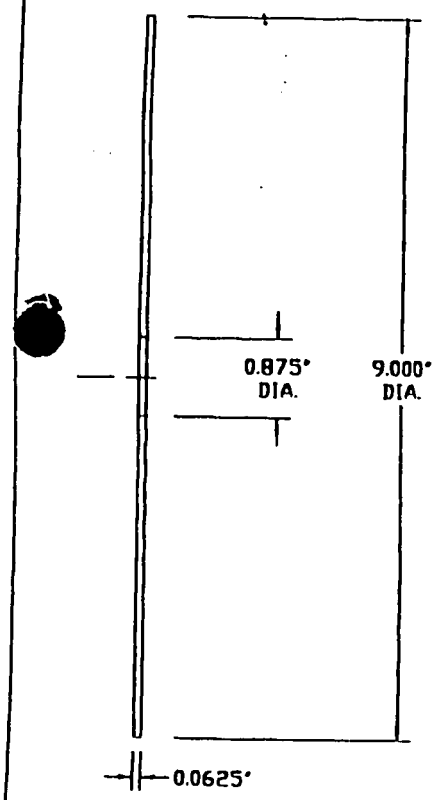
NOTES: MATERIAL: 86SS
TOLERANCES: +/- .005"
UNLESS OTHERWISE NOTED

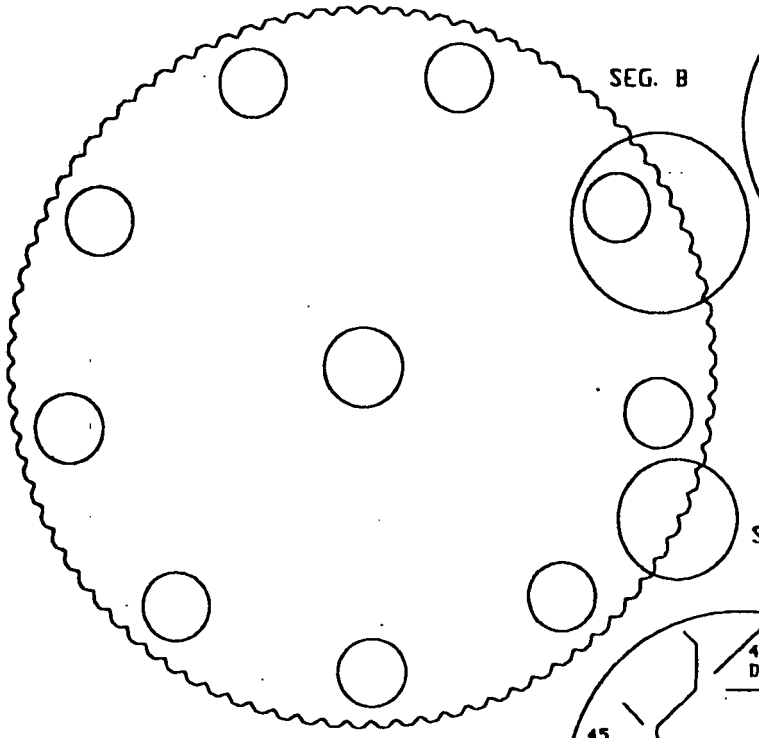
CONFIDENTIAL

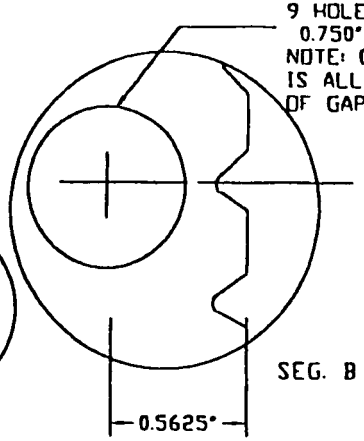
NORTON COMPANY

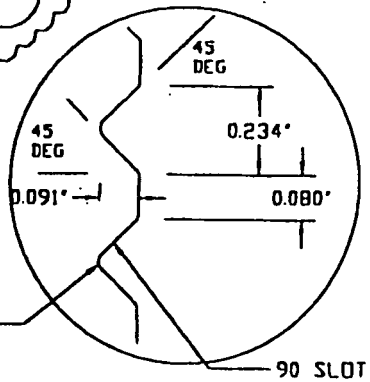
DWG.# 277

DRAWING NOT TO SCALE!









NOTES:

MATERIAL - 0186-5

TOLERANCES - +/- .005"
UNLESS OTHERWISE NOTED

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DWG.# E-plate